Performance Evaluation Metrics System

BDA 600 : Big Data Analytics Capstone Seminar

Submitted by

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Project Video: https://youtu.be/6D4Lrmmmc3g

May 02, 2023

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Name: **Bhagyashri Patil**
Course: **BDA 600 - Capstone Seminar**
Project: **Performance Evaluation Metrics System**
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Part 1:

Final Group Project Report

Appendix

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1. Team Contributions

Team Member	Tasks Performed
Bhagyashri Patil	Project statement topic research
	Build project roadmap and milestones
	Data source brainstorming and planning
	Data cleaning, data transforming, data validating, data loading
	Data modelling and profiling
	Exploratory data analysis
	Build the evaluation metrics considering all sub-departments and all employee positions under the Customer Care department
	Discuss and build KPIs for the evaluation metrics using QlikSense
	Visualizing key results using data analysis in QlikSense
	Optimize the custom views/ queries/ metrices
	Approve the dashboard design from management team
	Demo the dashboard to the management team and implement feedback
	Give hierarchy and role-based access to the dashboards
	Roll-up dashboards for go-live
	Conclude project and wrap-up the project documentation
	Website preparation
	Video preparation
	Group report documentation
	Individual report documentation

2.   Project Overview

2.1.   Background

- Valor Compounding Pharmacy is a company based in Berkeley, California, USA; who specializes in manufacturing and providing customized compounded medicines to the users.

- Custom compounded medicines simply means that if any user has any allergic reaction to any specific drug or any specific component of medication he/she is undergoing, Valor customizes the medication formula by using their pharmaceutical expertise and tried to build a customized medication with new replaced compound in place of the allergic compound and as per the user's specific needs.

- These medications are not available over the counter, and they are produced only on prescription request.

- They even offer a flat-rate pricing structure, which means even if the quantity of dose to be taken by user varies, they will still offer the medications at the same rate, irrespective of the dosage.

- Apart from this, they also give free shipping once the order is placed by user through online mode, and they have got the fastest turnaround time of 4 days, as compared to other available pharmacies.

2.2. Overview

- This diagram below gives us the high level overview of the Valor's Employee duties, starting from receiving a call and at end, where they finish with the prescription.
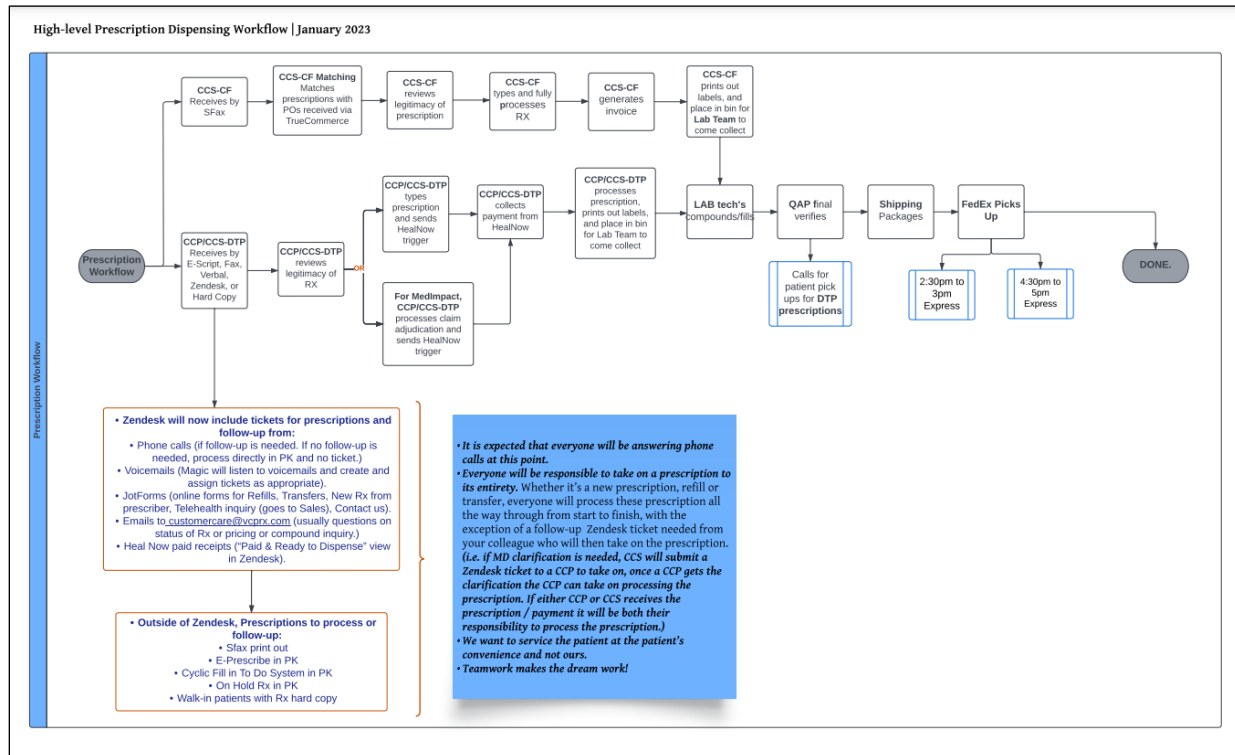

Figure 2.2.1 - Valor Employee's Duties Life-cycle

2.3. Problem Identification

- Employee performance was assessed solely by no. of prescriptions they type.
- As position is multifunctional, they're also required to :
  - answer phone calls and return phone calls.
  - solve customer service issues.
  - follow-up with doctors' offices and more.

- Solely one metric is not enough to fairly assess their performance and rewards only that one job task.

- This in turn creates less performance in all other areas except for typing in prescriptions.

- Hence, to develop a performance evaluation metrics system for the customer care department employees.

- **Solution / Goal:** Develop a matrix system of performance metrics for the customer care department at Valor Compounding Pharmacy.

2.4. Scope

- **Project Deliverables -** A series of dashboards in Qlik that report the following levels:
  - o Data metrics by overall department
  - o Data metrics by role / position within the department
  - o Data metrics by individual within the department

- Hybrid methodology used for development (agile + traditional).

3.   Objectives / Research Goals

3.1.   Roadmap

Week	Date	Tasks Defined
1	01/19	Project statement discovery
2	01/26	Weekly Sync-1 : Capstone project statement finalization
	02/01	Weekly Sync-2 : Project kickoff meeting
		Business requirements discussion
3	02/02	Project roadmap
		San Diego State University : BDA 600 - Project proposal presentation
4	02/09	Exploratory data analysis
	02/14	Weekly Sync-3 : Brainstorming session for data model building
		Data model for evaluation metrics
5	02/16	GitHub : create repository and project website page
		Lucid Chart : create dashboard wireframes and get design approval
		Documentation : add all details till date
	02/20	Weekly Sync-4 : Finalize metrics data model
		Demo first draft of model and validate
		Request Five-9 data push in Snowflake
6	02/23	Build custom data views for specific data metrics
7	03/02	QlikSense : Pre-requisites set-up
		Design dashboards
8	03/09	Demo the dashboards to the management team
		Implement feedback and improvise the dashboards
9	03/16	Optimize the custom views/ queries/ metrices
10	03/23	Website : Embed dashboard overview (aggregated views) and results
11	03/30	Re-iterate modifications and update documentation
12	04/06	Roll-up dashboards for go-live
13	04/13	Website : finalize website design and content to be posted
		Build video (summarize project in 3-mins)
14	04/20	Project wrap-up
		Documentation
15	04/27	San Diego State University : Final project presentation
16	05/02	San Diego State University : Final project report submission

4. Literature Review

- Discovery of process and considerations was carried out at the initial phase of the project. From which it was found that there are multiple roles inside every department.

- Customer Care branch is divided into 2 departments:
    o Central Fill (CF)
    o Direct to Patient (DTP)
    o Customer Care (All)

- Roles under Customer Care departments are as follows:
    o Customer Care Specialists - Central Fill
    o Quality Assurance Pharmacists (CF)
    o Customer Care Specialists - (DTP)
    o Quality Assurance Pharmacists (DTP)
    o Customer Care Specialists - Magic Team (All)
    o Customer Care Pharmacists (All)
    o Shipping (All)
    o Sales (All)

- Will Incorporate following in our final resultant dashboard:
    o Total # of Returned Calls for all Missed Calls
    o IVR Option Breakdown for each Option for how many calls were answered and missed.
    o Agent Status throughout their shift.
    o Matching Agent Status with Peak Time Call Hours.
    o Validating Magic's Work
    o Validating approximate agents needed per each shift to be available to take calls.
    o Customer Care KPIs
    o Total # of tickets created for each webform.

5. Database Management

5.1. Data Sources Architecture and Description

- *PK* (Compounding Pharmacy System Software) - For all prescriptions related data
- *Five9* - For all calls related data source.
- *Zendesk* - For all tickets related data
- *Homebase API* - For all employee schedule related data
- *Data Pipelining & Channelizing Tools* - Talend, Snowflake

- **Qlik Sense Data Sources Architecture**

    o The primary software we are using for our data analytics :
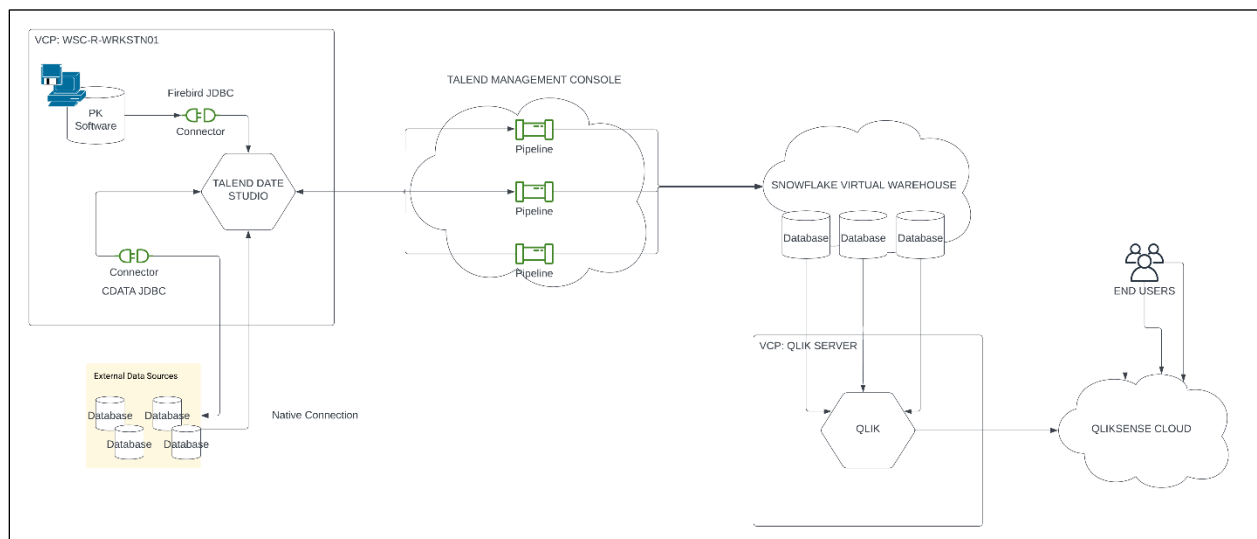

Figure 5.1.1 - Qlik Data Sources Architecture

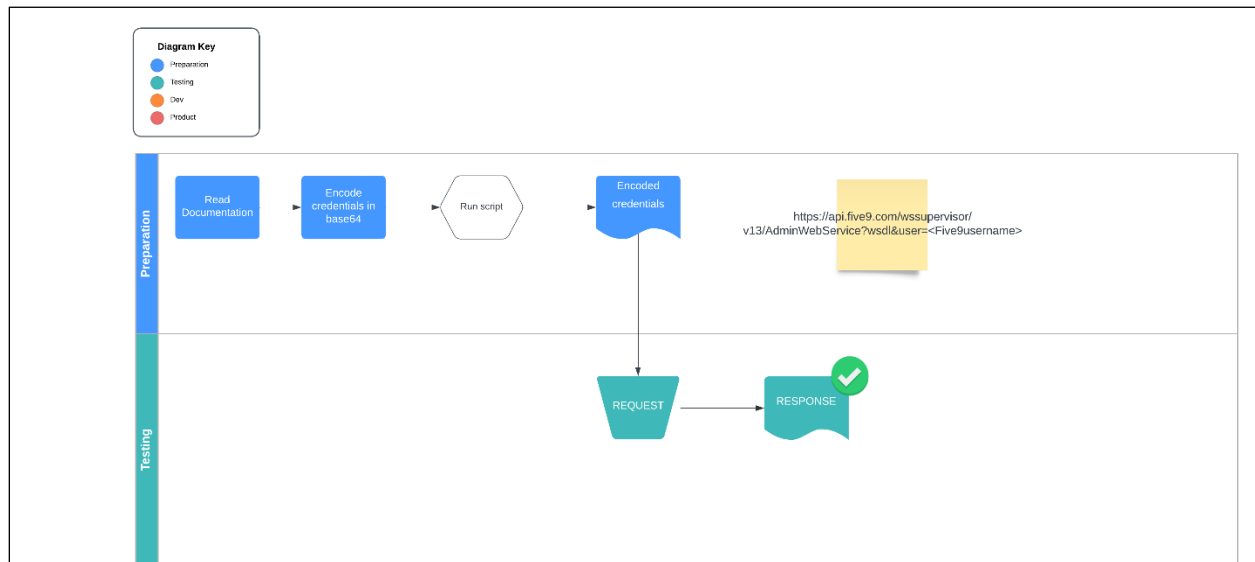- **Five9 Data Sources Architecture**

Figure 5.1.2 - Five9 Data Sources Architecture

6. Methodology

- I have used a series of Qlik Sense Dashboard for my final resultant project purpose.
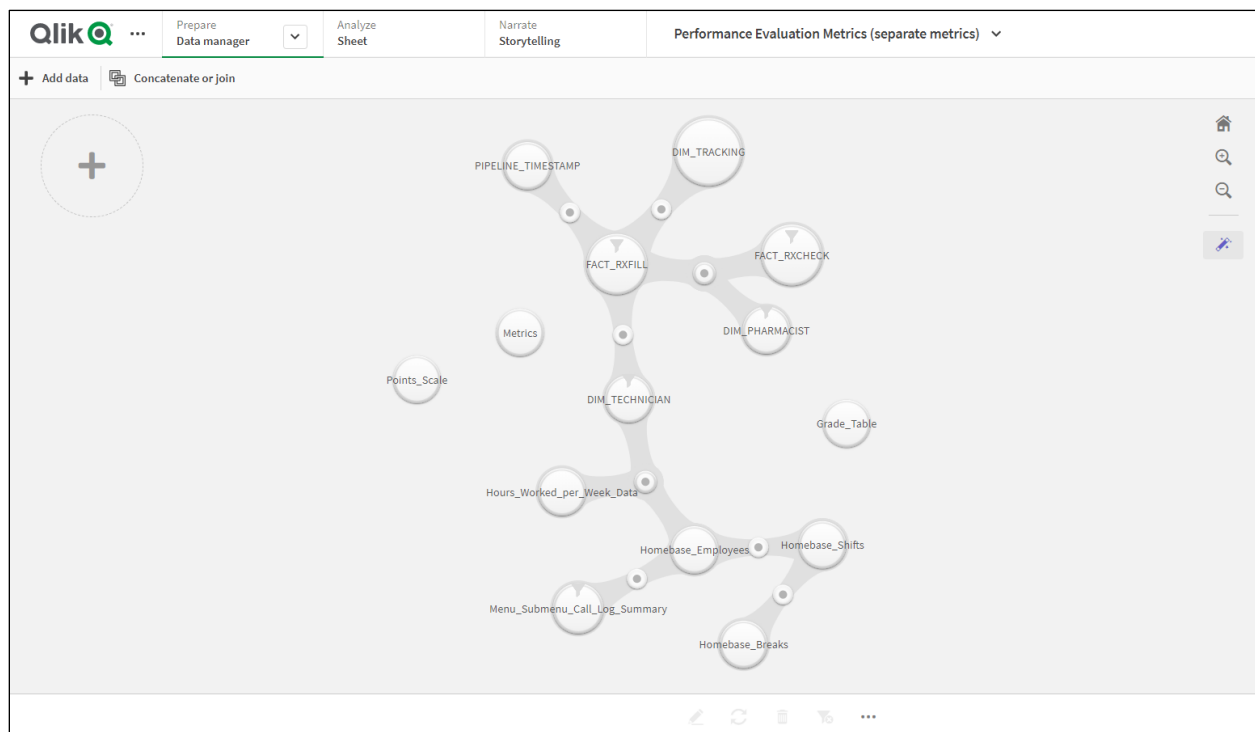
Figure 6.1 - Qlik Dashboard : Data Modelling Structure

- **Individual & Role Specific Dashboard Metrics**

   - I tried analyzing all roles and their department wise expectations and came up with this matrix format for this dashboard.

Data Metrics	Data Source	Goal of Metric (Based on 40 hours / week)
Typed Prescriptions	*PK*	CCS CF: Goal: 60 / day (min) CCS DTP Goal: 30 / day (min) Magic Goal: 0/ day CCP: 0 / Day Shipping: 0 /Day Sales: 0 /day
Avg Prescriptions Typed	*PK*	All roles
Filled Prescriptions	*PK*	CCS CF: Goal: 60 / day (min) CCS DTP Goal: 30 / day (min) Magic Goal: 0/ day CCP: 0 / Day Shipping: 0 /Day Sales: 0 /day
Prescriptions Verified	*PK*	All roles
Prescriptions Shipped	*PK*	All roles
Phone Calls Answered	*Five9*	Magic: 15/day (only from 1 to 2 pm) CCS CF: 32 est. calls/day CCS DTP: 40 est. calls/day CCP: 60 est. calls/day
Total Number of Phone Calls	*Five9*	All roles
Phone Calls Returned	*Five9*	Magic: 5/day (only from 1 to 2 pm) CCS CF: 5 est. calls/day CCS DTP: 6 est. calls/day CCP: 9 est. calls/day
Zendesk Tickets Worked	*Zendesk*	All roles: 30/day
Zendesk Tickets Solved	*Zendesk*	All roles: 30/day
Average time to Solve Ticket	*Zendesk*	All roles
Hours Scheduled	*Homebase (API)*	All roles
Hours Worked	*Homebase (API)*	All roles
% On-time arrival	*Homebase (API)*	All roles
Hours of 'Other' or 'In Meeting' Status	*Five9*	All roles

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7. Analytics and Visualization Results

- After visualizing the data sources with respect to every employee, I found out some key findings that will make us think as to why it is so crucial to have a Performance Evaluation Metrics System in place for tracking the efficiency of the Employees. Key findings are :

- **Calls Breakdown Answered vs. Missed Calls by Week**
    - As you can see in the graph below, we can clearly state that there are almost more than 40% - 45 % of calls getting missed by the employees.
    - This could result in the possible loss of the end user who could have been a potential customer.
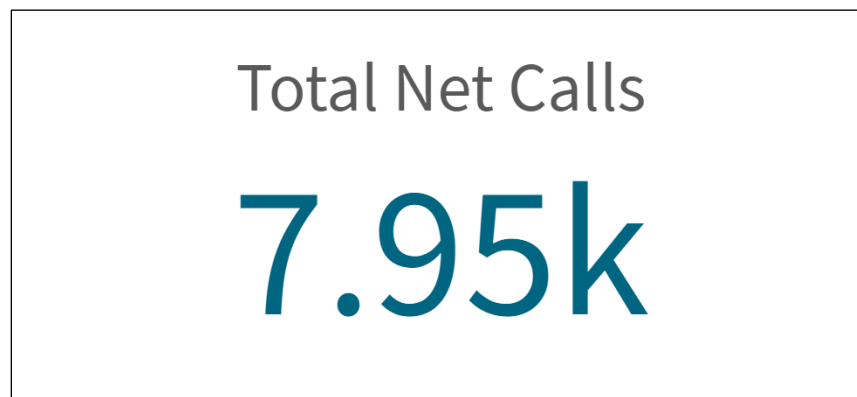
Figure 7.1 - Total Net Calls

- **Net Calls** - This is the total number of calls after subtracting calls with the following disposition: Caller Disconnected, Abandoned, Timed out, and Agent Error.
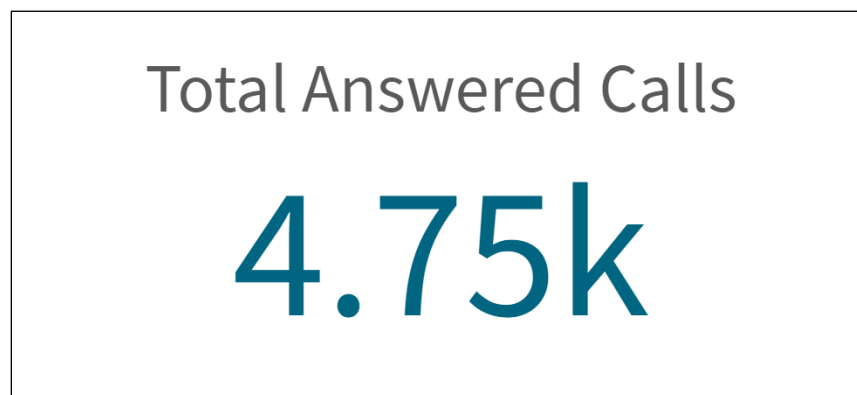
Figure 7.2 - Total Answered Calls

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- **Answered Calls** - are calls that were connected and answered by agents including calls that were transferred to Zoom. Call Queue Back calls that were completed are also counted.
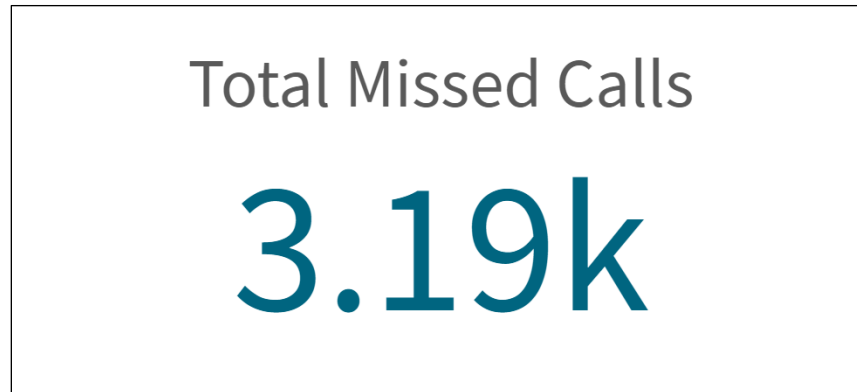
Figure 7.3 - Total Missed Calls

- **Missed Calls** - are calls that weren't answered due to unavailable agents and the caller is directed to leave a voicemail. Queue Call Back timeouts are also counted.
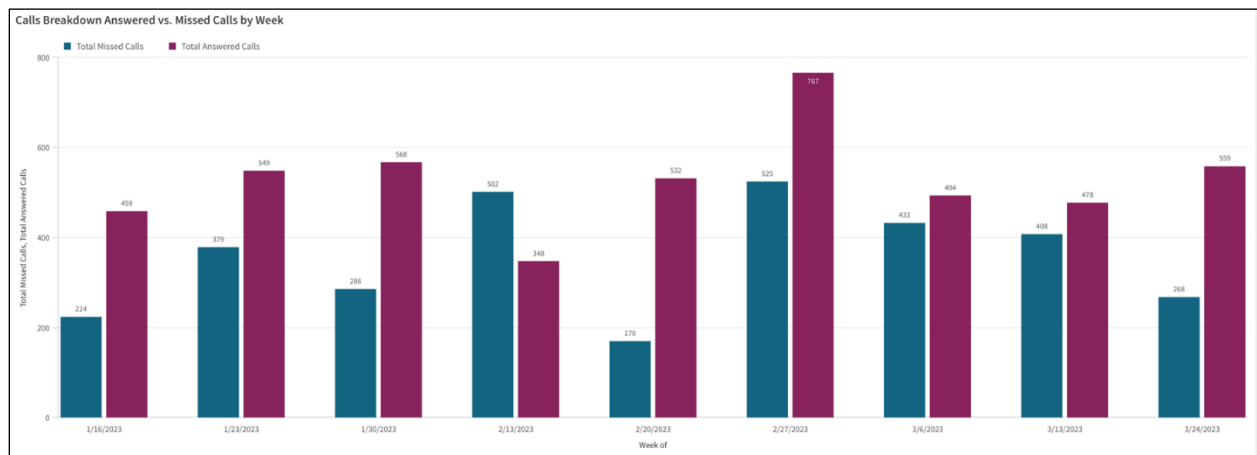
Figure 7.4 - Calls Breakdown Answered vs. Missed Calls by Week

- **Weekly trend of Missed Calls Percentage**
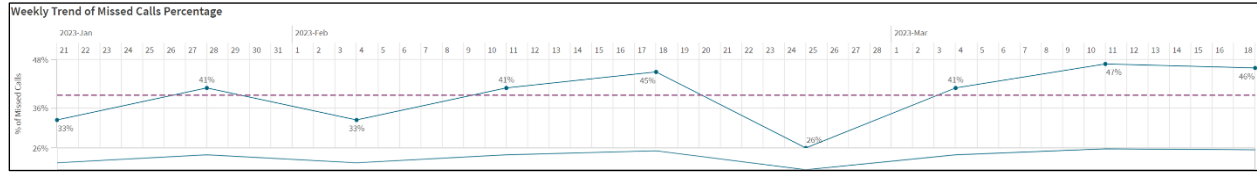
Figure 7.5 - Weekly trend of Missed Calls Percentage

- **Average % of Answered Calls**

Figure 7.6 - Average % of Answered Calls

- **Average % of Missed Calls**

Figure 7.7 - Average % of Missed Calls

- **Calls Breakdown by Hour**
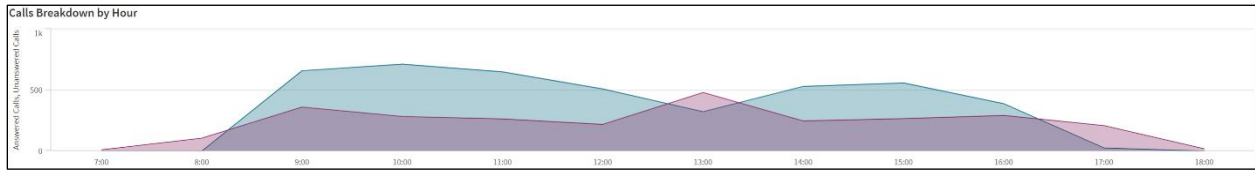
Figure 7.8 - Calls Breakdown by Hour

- The peak of high missed calls is at 1:00 pm (13:00). This is when we have only Magic answering calls and Operations focus on processing prescriptions.

- We are averaging about 400 calls answered and 250 calls missed hourly.

KPI Definitions:

- Total Answered = Calls Completed / Answered by Agents

- Total Missed / Sent to Voicemails = Calls that were sent to voicemail due to no answer, caller chose leave voicemail option and call back requests that timed out.

- Other = Abandoned, Errors, Busy Lines for Call Queue Back attempts

- Direct to Voicemail = Caller chose the voicemail option in the IVR. (This is offered only to MD's)

- **Prescriber (MD) IVR Options Call Breakdown**

MD IVR Options Call Breakdown

MD IVR Option	MD.Total Calls	MD.Total Answered	MD.Total Missed / Sent to Voicemail	MD.Call Queue Back Timeouts	MD.Other	MD.Direct to Voicemail
Calling for RX	694	307	254	21	112	0
Refills	311	157	98	0	56	0
Voicemails	127	0	0	0	0	127

Figure 7.9 - Prescriber (MD) IVR Options Call Breakdown

- 61% of MD calls goes to the Calling for RX option which in turn logs the highest number of missed calls.

- Voicemail offering in this inbox is not directly offered which means the prescriber would have waited in the queue prior to being directed to voicemail.

- 27% are for Refills and The Direct-to-Voicemail option is only chosen 11% of the time.

- **Patient IVR Options Call Breakdown**

Patient IVR Options Call Breakdown					
Patient IVR Option	Patient.Total Calls	Patient.Total Answered	Patient.Total Missed / Sent to Voicemail	Patient.Call Queue Back Timeouts	Patient.Other
Refills	1269	464	555	87	163
Status	1228	466	575	62	125
Transfer	253	138	64	7	44

Figure 7.10 - Patient IVR Options Call Breakdown

- We get a fairly equal number of patient calls going to the Refills and Status options. Both account for 91% of the type of calls.

- Both also account for high numbers of missed calls.

- Missed calls are all calls that weren't answered by an agent and instead directed to voicemail.

- In addition, Call Queue Back Timeouts have also been considered missed calls.

- These are patients who chose the option to get the call back, however, the call stayed in the queue for more than the maximum time allotted which drops this call.

- This is where you get the complaint that **they waited for a callback but never got one.**

- **Purchase Order IVR Options Call Breakdown**

PO IVR Options Call Breakdown

PO IVR Option	PO.Total Calls	PO.Total Answered	PO.Total Missed / Sent to Voicemail	PO.Call Queue Back Timeouts
PO Inquiry	972	604	289	0

Figure 7.11 - PO IVR Options Call Breakdown

- We are getting an average of about 32 to 35 calls per day from Kaiser Pharmacies, which is about an average of 4 to 5 calls per hour.
- Having two people dedicated to answering only calls from Kaiser is at 62% of calls being answered.

- **Total Number of Calls and Agent by Status Every Half Hour**

Total Number of Calls and Agent by Status Every Half Hour

Every Half Hour	Average Calls	Avg. Available for Calls	Avg. Unavailable for Calls
07:00	1	0	0
07:30	2	0	0
08:00	4	0	0
08:30	8	1	1
09:00	25	6	3
09:30	26	7	3
10:00	28	6	3
10:30	26	6	2
11:00	24	6	2
11:30	23	6	2
12:00	19	5	1
12:30	22	6	1
13:00	23	4	2
13:30	22	2	2
14:00	19	5	2
14:30	24	6	1
15:00	24	7	2
15:30	23	6	2
16:00	20	5	2
16:30	17	4	1
17:00	8	1	2
17:30	4	0	1

Figure 7.12 - Total Number of Calls and Agent by Status Every Half Hour

- The table shows the average number of agents that have their status in Five9 set as Ready for Calls and Not Ready every hour.

- We average about 6 in a Ready and 2 in a Not Ready State. and this includes CF, DTP, CCP, and QAPs.

- Average Handle Time is 5 minutes per call.

- Do we have enough agents ready for calls? We will get a definitive answer once we have all our data points gathered and really understand our missed calls. For this purpose, we came up with our dashboard solution.

- **Call Handling by Agents**

Call Handling by Agents

Agent Name	Total Handled Calls	Total Calls Answered	Total Outbound Calls
Coleen Avergonzado	1603	927	676
Denise Wood	295	223	72
Dublyne Langbao	24	18	6
Dyna Camanag	214	125	89
Elaine Villanueva	36	14	22
Elisabetta Caria	22	22	0
Gwendolyn Ta	460	262	198
Hoda Walker	2141	1227	914
John Paul Flandez	200	66	134
Karla Garcia	263	260	3
Kelvin Eviota	255	134	121
Leticia Pedroza	263	247	16
Nick Terranova	32	23	9
QAP 1	60	42	18
QAP 2	44	28	16
Rei Lee	521	332	189
Sarah Delvalle	157	157	0
Tiauna Kirkpatrick	309	308	1

Figure 7.13 - Call Handling by Agents

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8.   Project Dashboard

Employee Performance

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| Department | Role | Employee Name | 📅 01-03-2023 - 04-26-2023 ▼ | Last Data Refresh : 4/26/2023 5:58:51 PM |

Monthly Business Days

Jan	Feb	Mar	Apr
21	20	23	18

Employee Name :
Claire Fraser

Employee Department :
Direct to Patient

Employee Role :
Customer Care Specialist

Grade Scale Information

Grades	% Range
A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
E	< 59%

Color Code Conditions :
Goal >= 80% | Goal >= 60% & Goal < 80% | Goal < 60%

Employee Performance Summary

Values | Month | Metrics

	Jan				Feb				Mar				Apr			
	Per Day	Goal	Actual	% to Goal	Points	Goal	Actual	% to Goal	Points	Goal	Actual	% to Goal	Points	Goal	Actual	% to Goal	Points
Hours Worked	8	168	134.4	80.0%	80	160	136.0	85.0%	85	184	176.6	96.0%	96	144	143.3	99.5%	99.5
Hours Scheduled	8	168	152	85.0%	85	160	144	90.0%	90	184	176	97.0%	97	144	144	99.5%	99.5
Typed Prescriptions	30	630	321	51.0%	102	600	507	84.5%	169	690	598	86.7%	173	540	458	84.8%	170
Filled Prescriptions	30	630	321	51.0%	51	600	507	84.5%	85	690	597	86.5%	87	540	455	84.3%	84
Phone Calls Answered	40	840	453	53.9%	108	800	453	56.6%	113	920	453	49.2%	98.5	720	453	62.9%	126
Phone Calls Returned	6	126	63	50.3%	50	120	63	52.9%	53	138	63	46.0%	46	108	63	58.7%	59
Zendesk Tickets Updated	30	630	599	95.0%	95	600	570	95.0%	95	690	656	95.0%	95	540	513	95.0%	95
Zendesk Tickets Solved	30	630	504	80.0%	80	600	480	80.0%	80	690	552	80.0%	80	540	432	80.0%	80
% On-Time Arrival	95%	95%	84%	11%	88	95%	89%	6%	94	95%	80%	15%	84	95%	94%	1%	99
Maximum Number of Goal Points	-	1000	-	-	657	1000	-	-	776	1000	-	-	760	1000	-	-	812
Points Grade	-	-	-	65.7%	D	-	-	77.6%	C	-	-	76.0%	C	-	-	81.2%	B

Employee Schedule Information

Values | Month | Metrics

	Jan		Feb		Mar		Apr	
	Per Day	Goal	Actual	Goal	Actual	Goal	Actual	Goal	Actual
Overtime Hours Worked	0	0	0.35	0	0	0	4.27	0	2.75
Meal Penalties	0	0	0	0	0	0	0	0	0
Shifts Worked	1	21	19	20	18	23	22	18	18
Hours of "Other" or "In Meeting" Status	1.5	1.5	3	1.5	2	1.5	3.5	1.5	2
Hours Approved Paid Time Off	-	-	40	-	40	-	40	-	40
Hours Approved Unpaid Excused Absence	-	-	0	-	0	-	0	-	0
Hours Unexcused Absences	-	-	16	-	5	-	12	-	0

Problem..? - Write to us at "data@vcprx.com" :-)
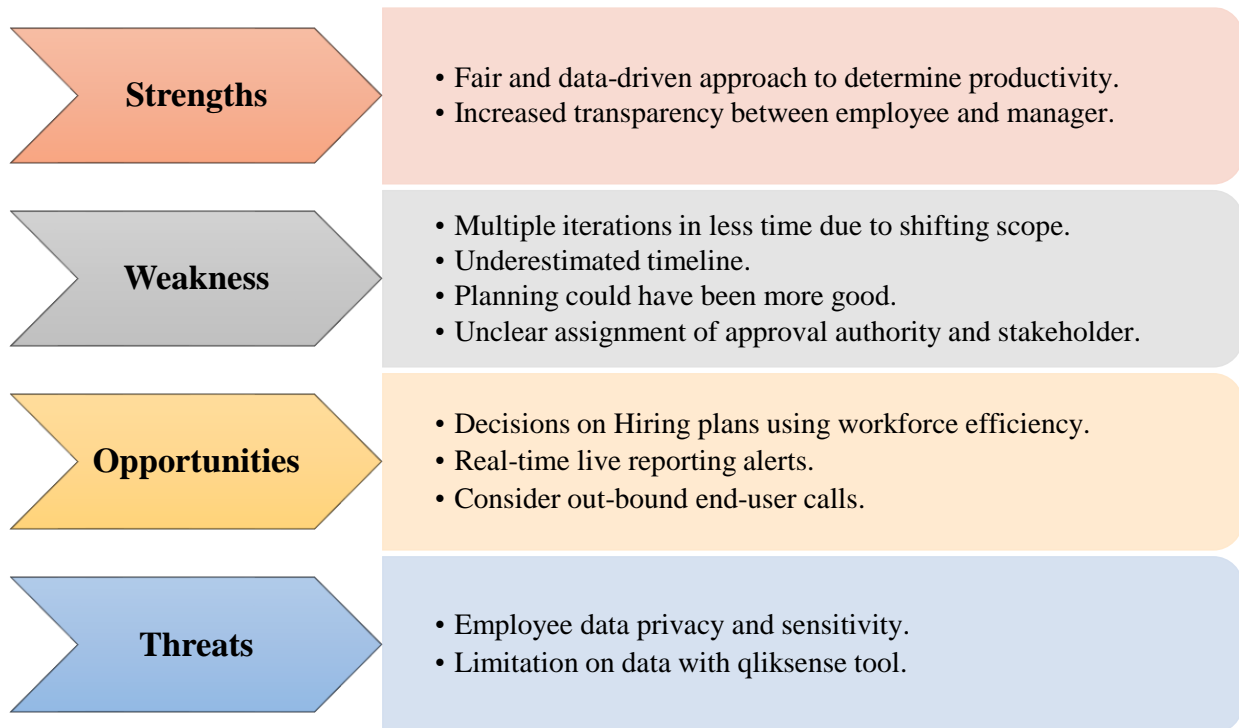
- The final output and resultant dashboard for evaluating the performance of the employees working in the Customer Care Department.

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9.   Discussion and Conclusion

9.1.   SWOT Analysis

Strengths
- Fair and data-driven approach to determine productivity.
- Increased transparency between employee and manager.

Weakness
- Multiple iterations in less time due to shifting scope.
- Underestimated timeline.
- Planning could have been more good.
- Unclear assignment of approval authority and stakeholder.

Opportunities
- Decisions on Hiring plans using workforce efficiency.
- Real-time live reporting alerts.
- Consider out-bound end-user calls.

Threats
- Employee data privacy and sensitivity.
- Limitation on data with qliksense tool.

9.2.   Feasibility

- Project requirements meets the data scope.

- Increased understanding due to the transparency between stakeholders and management.

- Risk mitigation plans at the initial stage for data governance and management practices.

- Improve customer service ratings.

- Capacity for new customers.

- High enough ROI to make the project worth pursuing.

9.3. Future Impacts

- Data-driven approach to determine employee productivity.

- Increased transparency between management and workforce.

- Improved work culture.

- Promotes accountability.

- Enhances team-alignment and cross-functional collaboration.

- Enhanced innovation and knowledge sharing.

- Ensures better business performance.

- Highlight and mitigate the bottlenecks of the system.